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Final Project Report (KJP 365)

Research on Forklift System

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1.1 INTRODUCTION

A forklift truck is a kind of machine that is used for moving, stacking and unstacking goods carried on wooden pallets or platforms that can be scooped up on the lifting fork. Forklift trucks can be seen in warehouses, factories, hypermarket, airports and seaport.

Most of the lifting machines or devices are driven by electric motor. Some machines such as stackers and forklift are commonly powered by diesel engines or petrol engines or low-pressure gas engines. The same power source or unit drives hydraulic mechanisms or pulleys and chains that raise and lower the forks that carry the loads. In addition, some kind of lifting machines such as forklifts may have tilt specialties to make a safer loads loading or being moved.

Some of the lifting devices have telescopic masts, which can extend upwards to allow the forks to stack loads up to 5 meter (16ft) above the ground. The carrying capacities vary from five tones with small machines to 50 tonnes or more. Besides that, a heavy weight at the rear of the lifting machines acts to counterbalance the load to preventing from tipping forward.

There are many principles of lifting. They may be in the forms of pulley and chains system, pulleys and screws system, hoist and cranes systems, hydraulic mechanism and elevating system. In our research and project, we have decided to choose the winding lever method of lifting system. The method used the screw jack system that turns to raise or lower the fork vertically. One turns is equal to the pitch of the screw's thread. With a fine pitch, small effort can lift a very heavy load.

1.2 HISTORY OF LIFTING DEVICE

Ancient Times

The lifting device appears to have been either an ancient Greek or Roman invention for which there is no record before the first century. Monument made of huge stone and constructed before the period, such as the pyramids of Egypt or Stonehenge in Britain, were built without any from of lifting device. As a general rule, when block of stone had to be rise an earth ramp was built up which the stones were dragged on rollers, and having been raised to the required height in they way, they were moved into position with simple levers.

Our knowledge of early lifting device comes largely from the writing of the Roman architect, Vitruvius, and the engineer, Hero of Elexandria, both whom were working in the first century. The simplest of this lifting device was no more than a single pole, one end of which was sunk of fixed in the ground. This beam was raised and held in the position by a pair of backstay attached to its upper end. The pulley-block, which held the hauling line, was fixed to the top. Usually the hauling line was operated by a windlass fixed to one side of the pole near its base, and Vitruvius describes how the same windlass can be used working on the backstays to raise a beam into position. Rather more complex was a similar lifting device made of two poles lashed together at their upper ends and with their feed set some distance apart, and thus similar to modern sheer legs. In such cases a single backstay was sufficient, while the legs were held in their relative position by wooden crossties like the rungs of the ladder; the windlass could be set between the legs.

Where very heavy loads had to be lifted, the windlass was replaced by a cage tread wheel, similar in design to tread wheels provided in some cages for mice and hamsters today, in which two or more men could use their weight to raise the burden, while other men could, if necessary, haul on ropes wound round the outside of the wheel.

Hero describes even more substantial lifting devices employing three and four beams, and he also discusses a form of lobster claw grapple that could be attached to the hauling line. Usually a shallow depression was cut on opposing faces of blocks of stone

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